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BUREAU OF ANIMAL INDUSTRY.

A. D. MELVIN, CHIEF OF BUREAU.

AN OUTLINE OF THE WORK OF THE DAIRY DIVISION.

By ED. H. WEBSTER, Chief.



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7 ORGANIZATION OF THE DAIRY DIVISION.

ADMINISTRATION.

Chief, Ed. H. Webster.

Assistant Chief, Clarence B. Lane.

Assistant Dairyman, Wm. Hart Dexter.

SCIENTIFIC STAFF.

Market Milk Investigations: Assistant chief in charge; R. H. Shaw, chemist (variations in normal milk); George M. Whitaker, Ellis M. Santee, Ivan C. Weld, assistants.

Butter Investigations: C. E. Gray, assistant dairyman, in charge; C. W. Fryhofer, assistant; E. A. McDonald, W. S. Smarzo, H. J. Credicott, market inspectors.

Cheese Investigations: C. F. Doane, expert in dairying, in charge. American varieties: John L. Sammis, chemist; J. W. Moore, expert maker. European varieties: Charles Thom, mycologist; Arthur W. Dox, chemist; T. W. Issajeff, expert maker.

Southern Dairy Investigations: B. H. Rawl, expert in dairying, in charge; H. N. Slater, Duncan Stuart, J. A. Conover, S. E. Barnes, J. W. Ridgway, J. E. Dorman, assistants; John Michels, collaborator.

Building and Management Investigations: B. D. White, expert in dairying, in charge; G. H. Parks, architect; W. J. Latimer, assistant; J. A. Lockie, architectural draftsman.

Dairy Laboratories: L. A. Rogers, bacteriological chemist, in charge.

INSPECTION STAFF.

Renovated Butter Factories: M. W. Lang, inspector, in charge, 510 Northwestern Building, Chicago, Ill.

Renovated Butter Markets: Levi Wells, inspector, in charge, Laceyville, Pa.

Inspectors: Robert McAdam, 510 Northwestern Building, Chicago, Ill.; George M. Whitaker, Washington, D. C.; E. A. McDonald, Seattle, Wash.

Deputy Inspectors: S. B. Willis, Boston, Mass.; R. A. McBride, 6 Harrison street, New York, N. Y.; J. H. Barrett, 6 Harrison street, New York, N. Y.; H. P. Olsen, St. Paul, Minn.

AN OUTLINE OF THE WORK OF THE DAIRY DIVISION.

The United States Department of Agriculture has fourteen principal branches, eight of which are called bureaus. The Bureau of Animal Industry has six divisions, and four other offices of similar grade. The Dairy Division was organized June 30, 1895, with Maj. Henry E. Alvord as chief. The work of this Division is "to collect and disseminate information concerning dairy farming, the care and improvement of dairy cattle, and the production, care, and distribution of dairy products." It maintains a general survey of the condition of the dairy industry in the country at large and in the different sections, in addition to special inquiries as to dairy organizations, dairy schools and facilities for technical instruction, State dairy laws, the development of markets, the milk supply of cities and towns, and the laws and regulations in reference thereto.

The Division also makes investigations as to the manufacture of butter and cheese, including European varieties of cheese, and concerning dairy machinery and equipment. The Division architect prepares plans and technical advice for the construction of sanitary and economical dairy buildings. The organization and management of creameries and factories and of the larger dairy

enterprises, now increasing in number and importance, are receiving special attention. The Division is also charged with the details of administration of the laws concerning the inspection of factories and markets for "renovated butter" and of dairy exports in general.

Reports upon all these lines of work are prepared and published in bulletins and circulars, a list of which is sent on application, and an extensive correspondence is conducted to ascertain and meet the needs of those interested in the various departments of the dairy industry. The Division seeks to serve as a clearing house for dairy experience and information. Its officers or agents visit the dairy centers and conventions for personal contact and advice.

ADMINISTRATION.

ED. H. WEBSTER, *Chief*.

The Division has 46 employees, 31 of whom are engaged in scientific work and 7 in the work of inspection. The organization of the Division is such as to place direct responsibility on the men in charge of the various lines of investigation. All general administrative work is directed by the chief of the Division, aided by the assistant chief, and an assistant dairyman.

The assistant chief, Mr. Lane, is also in charge of market milk investigations. (See p. 5.)

Doctor Dexter is in charge of dairy literature and extension work. This work includes the classifying and indexing of dairy literature, the preparation for the press of manuscripts and

other forms of information connected with the work of the Division, attendance at dairy meetings to present the work of the Division and to give instruction on dairy lines, and the collection and arrangement of information concerning the educational features exhibited in fairs and conventions at home and abroad. The object of this work is to make the material in hand available for ready reference, to promote the more systematic dissemination of information concerning dairy interests, and to coordinate the results of the various lines of dairy investigations so as to secure their practical helpfulness in actual application.

The Division is actively cooperating with 11 States, chiefly thru the respective State experiment stations, as follows: Arkansas, Connecticut, Georgia, Mississippi, Missouri, New York, North Carolina, South Carolina, Tennessee, Texas, and Wisconsin.

MARKET MILK INVESTIGATIONS.

CLARENCE B. LANE, *Assistant Chief, in charge.*

The Division is investigating market milk to secure the introduction and establishment of a uniform system for grading dairies engaged in the production of milk for market use, in cooperation with city boards of health. Special study is made of the work of milk commissions, to determine their economic helpfulness in the production of pure milk. The improvement of the production of milk for infants and invalids is also studied.

Mr. Shaw is engaged in the investigation of the

variations in normal milk as affected by feed, peculiarities of breed, gestation, period of lactation, and climatic influences. He makes a special study also of the composition of butter fat, the coloring matter of milk, the proportions of casein and albuminoids, and the digestibility of milk as affected by the varying conditions just named, with special reference to the needs of infants and invalids. The object of this work is to determine the formation or origin of milk and the possible control over its constituents by scientific methods of feeding and handling the dairy cows. This particular work is in cooperation with the State Experiment Station of Missouri.

One of the most recent investigations has been that of milking machines, a preliminary report of which is now in the hands of the printer and will soon be issued in bulletin form. Practical milking machines are felt to be a necessity, and careful tests seem to indicate that such machines are at hand.

The work of the various milk commissions and the production of "certified milk" are being investigated. The best methods employed by cities in securing a pure milk supply, including laws and ordinances, work of inspectors and their equipment, are being determined, and the latest information along these lines will presently be published.

Mr. Weld is making a study of methods of bacteriological and chemical analysis, and the care of milk in the homes of consumers, and is making tests of market milk. The general equipment and

practise on dairy farms are studied, together with the building and equipment of dairy stables, milk houses, and ice houses, the machinery necessary for use in market milk production, and the transportation and distribution of market milk.

A study of the milk supply of the city of Washington by Doctor Santee and Mr. Whitaker has been undertaken for educational purposes, to serve as an example, with the hope that similar work may be undertaken in other cities. The general object of these investigations is to improve the quality of market milk, and to do this as far as possible without increasing the cost of production.

BUTTER INVESTIGATIONS.

C. E. GRAY, *Assistant Dairyman, in charge.*

Butter investigations are conducted for the purpose of devising better methods of manufacture in whole-milk factories and in gathered-cream factories, and for the study of problems involved in the storage, transportation, and sale of butter, both at home and abroad. Special study is made of the control of moisture in butter, of measuring the salt, fat, and other constituents of butter, of methods of scoring butter, of the bacteriological and chemical analysis of butter, and of the causes of and remedies for taints and defects in butter. Another subject of special study is the machinery used in the manufacture of butter, including the farm separator. Cooperation is maintained with State dairy and food departments for the improvement of butter.

Mr. Smarzo, in New York, and Mr. Credicott, in Chicago, are engaged in special market inspections for the improvement of the poorer grades of creamery butter. Criticisms of the butter are written and sent to the butter makers, to the dairy and food commissions of the States in which the butter is made, and to the butter merchants handling it. Effort is made to get the makers of the butter to give descriptions of their methods of manufacture, and to follow up the suggestions offered by the inspectors for the improvement of the butter. These inspectors are also engaged in examining butter collected for educational purposes by State authorities and in investigating the general system of scoring butter in the markets.

CHEESE INVESTIGATIONS.

C. F. DOANE, *Expert in Dairying, in charge.*

The Division conducts investigations of American varieties of cheese, to study methods of manufacture, machinery, problems involved in the curing and storage of cheese, cheese markets at home and abroad, to collect statistics of American cheese, and to study methods of determining the quality of cheese and its digestibility at different stages of ripeness. This work is done in cooperation with the Wisconsin State Experiment Station. Cold-storage rooms are maintained at Plymouth, Wis., for experimental work in the curing and storage of cheese.

Doctor Sammis is making special investigations in the chemistry of American cheese to determine

the chemical changes which take place in the process of manufacture, while the cheese is curing, and while held in storage. The object of this work is to devise better methods of making American and American-Swiss cheese, to determine the causes of poor flavors and of the general poor condition of cheese on the market, and to encourage the more extended use of cheese in American homes.

European varieties of cheese are also being investigated. The subjects studied include the methods of manufacture of Camembert and Roquefort cheese, the mycological problems involved in the manufacture and ripening of these varieties, the development of flavors in the ripening of European cheese, the markets at home and abroad for these varieties, and the determination of the present extent of the manufacture and the character of the European cheese now made in the United States. The object of this work is to determine the feasibility of the manufacture of these varieties of cheese in this country and to extend their use. This work is carried on by Doctor Thom, in cooperation with the State Experiment Station at Storrs, Conn.

SOUTHERN DAIRY INVESTIGATIONS.

B. H. RAWL, *Expert in Dairying, in charge.*

The Division conducts southern dairy investigations with the object of extending and developing the dairy industries of the South. In this work the Division cooperates with State experiment stations and with individual farmers. The dairy

markets in the South are studied, and the endeavor is being made to solve certain special problems peculiar to this section. These problems include the housing of dairy cattle, the construction of buildings for dairy purposes, the refrigeration of dairy products, the production of forage crops for dairy cattle, the labor problem, the manufacture of butter and cheese, the inexperience of the dairymen, and the antipathy toward home markets, so far as these may be peculiar to the South. Special dairy meetings are held and conventions of farmers are attended by representatives of the Dairy Division. Every available means is sought for the promotion of the appreciation of dairying among the people.

Prof. John Michels assists Mr. Rawl as special collaborator at Clemson College, S. C. Mr. Rawl's other assistants in the field are assigned as follows: Mr. Slater in Texas, Mr. Stuart in Washington, D. C., and the general southern field, Mr. Conover in Virginia and North Carolina, Mr. Dorman in South Carolina and Georgia, Mr. Ridgway in Mississippi and Louisiana, and Mr. Barnes in Tennessee and Alabama. Mr. Rawl gives special personal attention also to work in Florida.

BUILDING AND MANAGEMENT INVESTIGATIONS.

B. D. WHITE, *Expert in Dairying, in charge.*

The Division conducts investigations to study the designing and erection of dairy buildings for all purposes, to prepare plans and specifications for the various types of buildings, to study the

organization and equipment of dairy factories, to promote the better management of such factories, to determine the relations and relative advantages of different methods of organization and systems of manufacture, and to make a comparative study of the prices of dairy products as received by the dairyman, the factory, the wholesaler, or commission merchant, and as paid by the consumer. Mr. White is making a special study of the relations between the butter factories and cheese factories, as these systems may influence economical dairying in particular communities. Methods of cooperation as practised in various sections of the country in the manufacture of butter and cheese are also studied.

Mr. Parks is engaged in the preparation of plans and specifications, as required by the Division, and in work of inspection and advice as to the construction and sanitary features of all classes of dairy buildings. A special study is being made of the forces brought into play in the filling of the silo and in the settling of ensilage, in order to determine the pressure developed and the strength of construction required to resist it. Studies are also being made of feasible and inexpensive plans for dairy buildings suited to various sections of the country. In connection with this work a limited number of plans are furnished to builders with the understanding that they are to keep account of the cost of construction and to furnish that information to the Dairy Division with such other data as may be necessary for the preparation of bulletins describing such work.

The object of these investigations is to provide accurate and authentic information on the various topics considered, to give assistance when needed in the planning and equipping of economical plants for dairy manufactures, and to assist persons desiring to organize industries of this kind by suggesting suitable plans and methods of organization.

DAIRY LABORATORIES.

L. A. ROGERS, *Bacteriological Chemist, in charge.*

The Division maintains dairy laboratories for investigations in the classification of bacteria, in the control of bacterial development in dairy processes, in the preparation and use of starters for the development of flavors, and in methods of chemical and bacteriological analysis of dairy products.

A special study is also being made of the causes of fishy flavors in butter and of gassy and other troubles in the manufacture of cheese. The object of this work is to determine the causes of both desirable and objectionable flavors developed in dairy products. A central laboratory is maintained in Washington, altho much of the work is done in the field.

RENOVATED BUTTER INSPECTION.

The inspection of renovated butter factories and markets, as required by the act of Congress approved May 9, 1902, known as the oleomargarine law, is conducted by the Dairy Division.

Inspection of Renovated Butter Factories.

M. W. LANG, *Inspector, in charge.*

Six inspectors visit the renovated butter factories monthly and observe the sanitary conditions at those establishments and the quality of the product manufactured, and determine whether the requirements of the law as to methods of manufacture and labeling are complied with. Major Lang also issues export certificates for renovated butter.

Inspection of Renovated Butter Markets.

LEVI WELLS, *Inspector, in Charge.*

Major Wells visits the principal butter markets of the country for the purpose of determining the methods of sale and the general distribution of renovated butter, with reference to the observance of the laws and regulations. He also assists the Solicitor of the Department of Agriculture in the preparation of cases for the prosecution of violators of these laws.

ADDITIONAL LINES OF WORK.

The Dairy Division is ready to extend its usefulness along other lines as Congress may provide the means. Some of these lines of work are already called for. The test associations of Europe have done much for dairymen abroad, and recent trials have shown their methods to be helpful in this country. The Dairy Division would gladly assist in the organization of a national system for testing dairy cattle. The problem of improving

the herds on the farms of American dairymen is one of the greatest importance, the solution of which will add millions of dollars to the national wealth.

The Division would welcome also the equipment for proper investigations, in cooperation with the various associations of breeders and dairy husbandmen, of the breeding and feeding of dairy cattle, under modern American conditions.

The manufacture of ice cream presents problems of special difficulty pertaining to all sections of the country and calls for such investigations as this Division should be prepared to make.

The economical use of the by-products of the dairy offers a field for study in which this Division could be of immense usefulness to the country at large.

Other lines of new work are being suggested, each of which is by itself a field capable of great development, and in most of which the national leadership of this Division ought to be promoted.

These new lines of work will be taken up as fast as the means are provided. The Dairy Division wishes to be of the greatest possible assistance to the important industry which it represents, and, to this end, invites the inquiries, suggestions, and intelligent cooperation of individual dairymen and of dairy associations thruout the United States.

WASHINGTON, D. C., *October 20, 1906.*

INTERNATIONAL DAIRY FEDERATION.

(FÉDÉRATION INTERNATIONALE DE LAITERIE.)

The third International Dairy Congress under the auspices of this federation will be held at The Hague, in September, 1907.

Committee of organization: President, Dr. P. S. Wijsman, Professor in the University of Leyden; Secretary, Dr. A. J. Swaving, Inspector to the Ministry of Agriculture, Trade, and Industry, The Hague; member for the United States of America, Ed. H. Webster, Chief of the Dairy Division, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

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